with decreased cellular sensitivity as the only tenable theory. This is now under investigation in our laboratory.

That alcohol is unique among our common metabolites in being oxidized at a constant rate, regardless of its concentration in the body, has long been accepted, based on the thorough investigations of Mellanby and Widmark. Thus the assertion of Haggard and Greenberg that this was false immediately inspired further careful investigation of this point. It is with gratification that I find Doctor Bogen's work on this problem to be entirely in accord with my own, supporting the thesis of the older investigators that alcohol is burned at a constant rate, and effectively refuting the contentions of Haggard and Greenberg.

INTRACAPSULAR FRACTURES: NECK OF THE FEMUR*

A STATISTICAL SURVEY OF END-RESULTS

By MERRILL COLEMAN MENSOR, M.D.
AND
EARLE T. DEWEY, M.D.
San Francisco

DISCUSSION *by Paul E. McMaster, M. D., Los Angeles; Keene O. Haldeman, M. D., San Francisco; E. W. Cleary, M. D., San Francisco.*

THE treatment of fractures involving the neck of the femur of an intracapsular nature has always been an important surgical problem, and in spite of the vast amount of work, both experimental and clinical, that has been done on this condition, and the tremendous strides that have been made in the care of other common traumatic bone injuries with marked improvement in end-results and reduction of disability, this fracture still presents to the profession as great a mystery in how it should be handled as it did over one hundred years ago. In spite of the addition of the x-ray to our armamentarium, the title, "The Unsolved Fracture," used by Kellogg Speed in a recent article, accurately sums up the present state of our knowledge and ignorance.

COMMENT ON THE LITERATURE

A cursory review of the literature immediately gives us the impression that the very problems confronting the surgeon of today were faced by the men of over one hundred years ago. They were at that time equally cognizant of the difficulties now encountered, obtained end-results equally as bad as our own, and used various types of apparatus and manipulations, the principles of which are but little changed from those now commonly used.

Baron D. J. Larrey, in a monograph published in 1823, on treatment of the fractured neck of the femur, discusses the use of the spica bandage, and deprecates the use of extension for traction, stating that this latter type of procedure has been used in all apparatus from the time of Hippocrates and Avicenna. It is his opinion that, instead of assisting nature in the reorganization, it aggravates the evil. He believes that primary reduction of the fracture is simple and, therefore, there is no need of extension and traction on the fragments. Various pulmonary conditions and other complications, with which we are altogether too familiar, are spoken of as the result of this treatment. He is of the firm opinion that lack of fixation with increased motion is one of the causes of nonunion. The rigid spica bandage, very similar to our plaster of paris, was used in an attempt to maintain fixation after reduction was done.

Sabatur is quoted as using a stuffed straw-bed, with the limb held immobilized by well-filled oak-chaff bags, which is practically a parallelism for the sand-bag treatment, still occasionally used by the modern surgeon. Splints, both metal and wood, strikingly similar to the Thomas splint of today, double splints, using the same principle as the recently developed Jones traction splint, Buck's extension, the double incline plane, are all mentioned and have their advocates and critics.

J. H. Burge, 1859, advocated the use of traction with adhesive tape and counterpressure against the ischium of the patient, allowing him freedom to sit up and move about rather than some of the more cumbersome types of apparatus, which prevented anything but the supine position.

NONUNION DIFFICULTIES

Throughout this entire mass of literature, one is struck by the large percentage of nonunion and the attempts of the various surgeons to explain the condition. In seeking an explanation of the failure of union, such men as E. M. Moore, Nicholas Senn, and Levi Cooper Lane, have offered theories and experimental work. Theories in callus formation were everywhere advanced. There is the so-called vascular theory which requires apposition of the bony ends, allowing the blood vessels to unite across the fracture site to form the callus. Secondly, there is the formation of callus by the aid of the periosteum. Advocates of this theory point out at great length the absence of periosteum around the neck of the femur. Thirdly, there is the interposition of a peculiar albuminous substance between fragments. This is undoubtedly similar to a preosseous substance, recently described by Leriche and Policard in their monograph on "Growth of Bone," recognized by these investigators before the advent of the x-ray and microscope.

The causes of nonunion are given as lack of circulation of the head, absence of periosteum about the neck of the femur, lack of a true membrane, which would help make a mass capable of retaining bones in close contact and assist in the generation of callus. The fact that the fracture is entirely intracapsular, allows effusion of synovial fluid which causes motion and effects callus in a chemical manner. This is contrasted with extracapsular fractures in which the blood is not changed by the synovial fluid and a definite hematoma formed, which allows the progress of union and callus formation. Although the theory of the retardation of union by synovial fluid was advocated by Charles Bell in 1824, he rather typifies

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the pessimism of that day in the following quotation, "All our hopes in succeeding in curing a fracture of the neck of the thigh bone have been successively abandoned."

EXPERIMENTS OF NICHOLAS SENN

In 1883, Nicholas Senn did some very interesting experimental work on animals. He found that fracturing the necks of the femur of dogs and immobilizing them invariably gave nonunion. However, in a series of some thirty-odd cats, in which the fracture was immediately followed by pegging of the bone either by a nail or a bone peg through the neck, the percentage of union was considerably higher. The cause for nonunion of intracapsular fractures was attributed to inability to maintain perfect coaptation and immobilization of fragments during the time required for bony union to take place. The operative procedure gave a perfect degree of coaptation and immobilization of the fragments. The patient could be placed in any position in bed, or even be taken out of doors as soon as the dressing was applied, thus preventing excoriation and diseases, and prolonged confinement in bed in a recumbent position. How similar is this advocacy to the use of the Smith-Petersen nail and the immediate bone-pegging, now so commonly heralded as "the answer to the maiden's prayer."

RECENT METHODS TO SECURE MOBILIZATION

We then progress to the era of the Whitman abduction treatment, in which he, perhaps inadvertently, reverts to the theory and methods of immobilization of Larrey, some half-century before. This, likewise, had its vogue with variable success, but the large percentage of nonunion was still unanswered. We find nailing of the fragments again adopted, as aseptic surgery makes this procedure less hazardous to be cast in the discard, and recently revised with some mechanical improvements advocated by Smith-Petersen.

Very lately splendid mechanical devices by Jones of Grass Valley, California, and Anderson of Seattle, have given us a means for perfect anatomical replacement of fragments, but not a sufficient increase in the number of bony unions obtainable by their methods to warrant universal adoption.

It is, likewise, interesting to note that Brainard, a century ago advocated boring through the fractured end of the bone in cases of delayed or nonunion to stimulate callus formation. This has been very recently advocated by some of our contemporaries in the treatment of such cases.

It is our hope that we have portrayed from the above résumé the present status and lack of progress made in the therapy of fracture of the neck of the femur, and believe by the presentation of the following statistical analysis to further demonstrate the need of a coördinated effort on the part of the surgeons to devise a uniform procedure that will improve the end-results in this disabling condition, or at least demonstrate the scientific causes for the nonunion, so a prognosis can be given with some assurance.

MATERIAL INCLUDED IN THIS SURVEY

This survey represents a series of 148 consecutive cases, consisting of eighty-nine intertrochanteric, fifty intracapsular, six shafts, and three pathological fractures of the femur, treated by many competent surgeons of the San Francisco area on the staffs of the University of California and Stanford University in the past seven years, by various accepted methods. It constitutes all of the cases of this nature admitted to the Laguna Honda Infirmary of San Francisco, for a period extending from January, 1928, to July, 1934. As we are particularly interested in the intracapsular fracture, we have found that in fifty cases of this type, forty-four were treated at the San Francisco Hospital, five at the Laguna Honda Home, and one at the Saint Francis Hospital.

METHOD OF ANALYSIS

Our method of analysis is shown by a typical chart, here illustrated, which covers the important points of age, sex, the elapsed time of reduction, method of treatment, period of immobilization, hospital complications, and end-results, with the amount of permanent disability present in those cases in which a final follow-up and check-up examination was possible.

Following the accompanying outline, using a separate form for each individual patient, it was found that out of 148 cases studied, there was approximately 33 per cent of the cases of the strictly intracapsular variety. Of these, twenty-seven were males and twenty-three females. The fractures involved the right lower extremity in twenty-one cases, and the left lower extremity in twenty-nine cases. The average age of the patients was 61.8 years, the youngest being 45 and the oldest 90. The mode of injury was decidedly interesting. We were greatly impressed by the minimal amount of trauma necessary to produce a potentially serious injury. This revives the subject that has been discussed for over a hundred years, about the character of the osseous tissue and its relative circulatory changes as age advances. The causes of accident were delineated according to their frequency, as follows: Thirty-two patients sustained their fractures by a simple fall to the floor or street from a standing position. Seven fell down stairs of varying lengths. Five were injured in automobile accidents, four fell out of bed, and two were knocked down in fights. As the relationship between syphilitic infection and nonunion has always been a point of consideration in fractures, out of Wassermann tests made on forty-one of the patients, only seven were found to be positive.

ELAPSED PERIOD BETWEEN TIME OF INJURY AND REDUCTION OF FRACTURES

The elapsed time between the sustaining of the injury to the reduction of the fractures shows an average of nine and six-tenths days, the shortest period being two hours and the longest time three months and ten days. In four of the cases no data were available, in four others no attempt at reduction was made. Methods employed in the

Name		Age	Sex	Date of Fracture	(Right, Left)
Mode of Injury					
Elapsed Time to Reduction				Wassermann	
Method of Treatment				Where	By Whom
Period of Immobilization					
Elapsed Time to Ambulation				With Crutches	Without Crutches
Time of Transfer to L. H. H.				Time to Discharge as Ambulatory	
X-rays	On Entry				
	Following Reduction				
	Final				
Hospital Complications	Decubitus			Pulmonary	Mental
	Intestinal			Urinary	Others
Efficiency of Apparatus					
	Changes				Duration
Final Examination - Complaints					
	Shortening			Attitude	Stability
	Motion (Percentage as Compared with Normal Leg)				
				Active	Passive
	Flexion				
	Extension				
	Abduction				
	Adduction				
	Internal Rotation				
	External Rotation				
End Result of Fracture				Death	Cause
Permanent Disability					

Fig. 1.—Chart used for individual analysis.

reduction of this fracture utilized a wide range of accepted therapy. Several of these patients, after an unsuccessful attempt by one method, were treated by two or three other types of procedure. In two cases the records failed to reveal sufficient data as to the technique employed. The following methods were employed and are enumerated according to frequency.

Wilkie boots, 16
Whitman procedure, 10
Jones traction splint, 4
Buck's extension, 3
Skin traction, 2
Resection of the head, 1
Multiple drilling, 1
Thomas splint, 6
Double plaster of paris spica, 14
Autogenous peg, 3
Sand bags, 3
Skeletal traction, 1
Whitman reconstruction, 1
Sheehy frame, 1

SOURCES OF THE CLINICAL MATERIAL

These patients were treated by twenty different surgeons (on the staff of the San Francisco Hospital) from the University of California and Stanford University Medical School; twenty-five cases were treated on the University of California service and nineteen on the Stanford service. Five cases were primarily reduced at the Laguna Honda Infirmary.

The period of immobilization following these various procedures showed an average of sixteen weeks, the shortest time being seven weeks and the longest thirteen months. There were eight cases in which the date of removal of immobilization was not recorded in the record.

The elapsed time, from the date of the fracture to the date at which the patient first began weight-bearing with crutches, showed an average of twenty-five weeks, the shortest time being ten and one-half weeks and the longest seventy-nine weeks. This does not include thirty-three patients who never left their beds, following their accidents.

INFORMATION SECURED THROUGH X-RAY EXAMINATION

Review of x-rays available for study, in forty-one of the cases showed the typical deformity of fracture of the neck with upward and backward displacement of the shaft combined with varied amounts of external rotation. The average amount of displacement resulted in about one inch of shortening, and it was frequently observed that in those cases unsuccessfully reduced, this was increased rather than decreased, following manipulation. In nine patients x-ray data, following reduction, were not available. In the remaining forty-one, twenty-one showed good anatomical replacement of the fragments; ten showed passable reduction, sufficient to obtain bony union with some deformity; ten patients had poor and incomplete reduction. Considering these x-rays, we must admit that our criteria for the above conclusions are necessarily limited, as it has been only within a relatively recent period that lateral x-rays of fractures of this character have been introduced. Some of the cases which are classified as excellent might have shown incomplete reduction had lateral x-rays been available. The criterion adopted for passable reduction required approximately three-quarters of the fractured surfaces to be in apposition. The final x-rays in those cases of nonunion showed various degrees of absorption of the neck of the femur up to almost complete obliteration. In some, in spite of evident nonunion, the character of the detached head indicated that it was still viable, while in others marked increase in density, when contrasted with the adjacent bone, resulted in the presumptive death of the head. In three patients in whom a definite diagnosis of union was made in their records, attempted confirmation by physical examination and further x-rays, showed a characteristic nonunion with good functional results.

COMPLICATIONS ARISING IN THE CONVALESCENT PERIOD

A physician who has had a patient suffering from this type of injury under his care realizes the importance of good nursing and the complications that are apt to ensue, resulting not alone in unfavorable end-results relative to the fracture, but often in the demise of his patient. In this series thirty-three cases, or 66 per cent, had definite complications during their convalescent period. Nineteen cases developed decubiti, many so extensive that the type of treatment instituted had to be discontinued. This complication was found as decidedly prevalent following the use of immobilizing plaster, including part of the trunk. The plaster frequently became soiled by perspiration and excreta, difficulty was undoubtedly entailed in keeping the skin healthy and dry, and not uncommonly upon removal of the spica, decubiti, involving the entire sacral area, often extending to the osseous structures, was noticed. In contrast to this, in those patients treated by apparatus which did not necessitate maintenance in

Fig. 2.—Typical case showing recent intracapsular fracture of femur.

Fig. 3.—Same patient demonstrating excellent anatomical reduction.

Fig. 4. — Same patient, showing typical nonunion.

the supine position and allowed free access to the buttocks and lower back without pelvic fixation, complications of this nature rarely occurred. The next most frequent complications were pulmonary and genito-urinary. Ten cases developed pneumonia shortly following the accident, which was attributed to the supine position necessitated by the method of treatment used. Ten had urinary disturbances, incontinence and cystitis being the most common findings. Gastro-intestinal complications developed in eight cases, typified mostly by distention, partial ileus, and inability to pass flatus per rectum. In a few cases the condition progressed to the point where vomiting became of serious importance. Mental changes were noted in seven cases and seemed to bear no relationship to advanced age of the patients, as one of the most serious cases of mental aberration occurred in a relatively young individual. Improper application of the apparatus caused such extreme discomfort to three of the patients that the method of procedure had to be changed. One patient developed a peroneal palsy during the use of a Thomas splint.

MORTALITY FIGURES

The mortality of this series showed sixteen deaths, 32 per cent, the average lapse of time to death following initial injury being six months. the shortest one week, and the longest three years and four months. All of these patients were still bedridden as a result of their fracture. Death cannot be attributed to the fracture *per se* in some of these cases. Chronic cardiovascular disease accounted for six, carcinoma of the stomach one, general paresis one, diabetes one. Deaths directly attributed to the fracture resulted in four from general sepsis due to extensive decubiti; pneumonia accounted for two; agranulocytosis, secondary to the use of large doses of pyramidon for the relief of pain, caused one.

HOSPITALIZATION PERIODS

The average period of hospitalization in the San Francisco Hospital in the forty-four cases treated by them was seventy-eight days, the shortest being eight days and the longest four hundred and ten days.

COMMENT

The result of this survey has demonstrated that, in spite of treatment rendered by a large number of competent surgeons in San Francisco, using various types of methods in their therapy, the end-results obtained in the care of this fracture are decidedly poor. There was not a single case in the series in which complete bony union was demonstrable.

The opinion is prevalent in many circles that nonunion results in a permanent crippling, causing almost a total disability. We believe that this error has arisen because of diagnosis based solely on x-ray findings, rather than on accurate analysis of the patient's functional ability. We have found that eleven of the cases examined demonstrating a frank nonunion are ambulatory with a minimal amount of discomfort, some using a cane and some without support of any kind. They all have shortening and a definite limp, but are able to take care of themselves without assistance and perform many types of useful work. At the present time there are seventeen bedridden, eleven ambulatory, six ambulatory on crutches. This, in our opinion, definitely contradicts the impression that nonunion is incompatible with future usefulness of the injured extremity. In the thirty-four living cases, final check-up examination was possible in twenty. Of these we found the average range of motion to be limited as follows: Flexion, 50 per cent; extension, 70 to 75 per cent; abduction, 30 to 40 per cent; adduction, 10 to 15 per cent; internal rotation, 95 to 100 per cent; external rotation almost unrestricted.

SUMMARY

One hundred and forty-eight cases of fractured femur entering the Laguna Honda Home have been analyzed over a period of six and one-half years. Of these, fifty cases were found to be definitely intracapsular in type. Bony union was unable to be demonstrated in any case in the series. The mortality rate was 32 per cent, although the average death following the initiation of the fracture was six months, thereby reducing the mortality directly attributed to the fracture to a much smaller percentage. Eleven cases of definite non-

Fig. 5.—Recent unreduced fracture, intracapsular of femur.

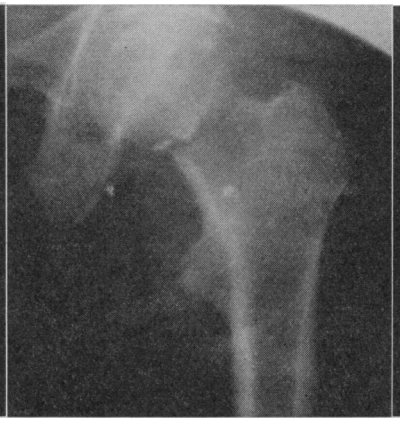

Fig. 6.—Same patient showing excellent anatomical replacement.

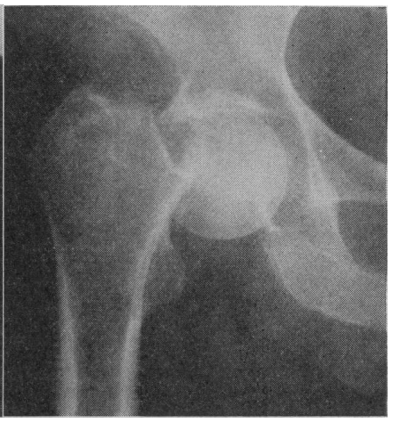

Fig. 7.—Same patient six months later with typical nonunion.

union are ambulatory, the patients carrying on some type of occupation.

CONCLUSIONS

1. The present methods used in the treatment of intracapsular fracture of the neck of the femur are unsuccessful for the promulgation of bony union.
2. Nonunion of the fractures does not bear any direct relationship to the age of the individual in this series.
3. Nonunion is not incompatible with weight bearing and the carrying on of certain limited occupations.
4. Twenty-two per cent are ambulatory, without support.
5. Mortality in the series was 32 per cent.
6. The injury results in the majority of instances from relatively minor trauma.
7. Thirty-four per cent are still bedridden after a period of one to seven years.
8. Treatment directed at early activity of the patient seems to offer a more favorable prognosis and markedly reduces the morbidity of the complications.
9. Proper nursing care is as important as accurate reduction of the fracture.

490 Post Street.

DISCUSSION

PAUL E. MCMASTER, M. D. (1930 Wilshire Boulevard, Los Angeles).—I wish to compliment the authors of the foregoing work, first, because of the large amount of good statistical data which they have accumulated, and, secondly, for the unbiased manner in which they have presented their study.

Clinicians who see and treat many intracapsular fractures of the neck of the femur know that the results are not encouraging, either for bony union or satisfactory function; or, in a number of cases for life itself, often irrespective of the type of treatment. Rather startling figures are presented in this paper, namely, no case in fifty intracapsular fractures of the neck of the femur resulted in bony union and, in addition, there was a mortality of 32 per cent.

Numerous new treatments for this fracture, as mentioned, are to be found in the current literature. Some are new, others are old principles with new applications. Although different ones of these methods are claimed to give excellent results, such does not obtain in the hands of the majority of clinicians. Hence, one sees the necessity for continuous investigative work in this special type of fracture.

A review of a large number of cases of intracapsular fracture of the neck of the femur at the Los Angeles County General Hospital has impressed me with a few fundamentals and results in the treatment. To begin with, there was a relatively low percentage of bony union. However, the mortality rate was lower than 32 per cent, as quoted above.

The necessity for lateral roentgenograms is imperative, as illustrated in the following case. In the anteroposterior view, as shown in the lantern slide I am exhibiting, the fracture fragments appear to be in direct approximation. However, the lateral view, as you can see, shows the fracture surfaces unopposed in any portion. Further, that roentgenologic interpretations are not always entirely accurate is illustrated in another case and by this next slide.

This shows the upper portion of the femur removed at autopsy from a woman in her sixties, who died of pneumonia, fourteen months after receiving an intracapsular fracture of the femoral neck. She had walked some on the leg, and clinical roentgenograms indicated a bony union. Even the specimen picture indicates bony union. A sagittal section of the specimen, however, reveals that the union was not bony, but cartilaginous and rubbery motion existed between the two fragments. This is the type of case which I believe explains why some patients who are supposed to have bony union, subsequently "break down" and result in nonunion and all the usual associated symptoms.

Another observation gained from this study was that bony union resulted in those cases in which there was little or no displacement of the fracture fragments, wherein adequate immobilization could be maintained in almost any type of treatment. This, I think, tends to minimize the deleterious effect of synovial fluid on the healing of these fractures; for with cortical breaks, as these cases show, and no periosteal covering, synovial fluid could infiltrate into the fracture site and still exert its often-claimed inhibiting influence to callus formation.

A further impression gained from this study was that in those cases with displacement of the fracture fragments, not only was adequate reduction necessary for healing, but complete and uninterrupted immobilization as well. In each case in which good reduction, as determined by anteroposterior and lateral roentgenograms, was obtained, which in turn was followed by slipping of the fragments (even though a fair portion of the fracture surfaces were still opposed) nonunion resulted. On the contrary, if no slipping occurred after reduction, irrespective of the type of treatment, bony union usually followed.

Thus, in addition to adequate reduction, the necessity is seen for complete and well-maintained immobilization, whether obtained by closed or operative procedures, both of which, I believe, have their place.

KEENE O. HALDEMAN, M. D. (350 Post Street, San Francisco).—It is worth while to study the failures that occur so frequently in intracapsular fractures of the neck

of the femur. The foregoing careful analysis should point the way to a better treatment of such cases.

I have observed many of the patients so studied in the Laguna Honda Home, and can confirm the results which have been recorded. However, these cases are not a true cross-section of the end-results which were obtained in the San Francisco Hospital, because the patients whose fractures united were discharged, and those in whom union was delayed or absent were sent to the Laguna Honda Home. The authors have emphasized the fact that a good functional result may be found in those fractures showing a firm fibrous union, without demonstrable bony union.

The ideal treatment of intracapsular fractures will combine absolute fixation of the perfectly reduced fragments with early motion of the hip and activity of the patient. Recent advances toward this goal include the Smith-Petersen flanged nail, and the use of multiple Kirschner wires, the insertion of which is guided by radiologic examination at the operating table. In the absence of the equipment and experience that such methods require, it is possible to obtain good bony union in about two-thirds of these cases by means of manipulative reduction followed by the Whitman type of plaster spica cast. Patients treated by the latter method should be turned on the face twice a day, should carry out deep-breathing exercises, and should be given carbon dioxid inhalations during the first week. After six weeks, partial mobilization of the knee is started by the removal of the part of the cast on the posterior aspect of the calf and heel. The hip should be immobilized for twelve weeks or longer, depending upon the radiologic examination, which in all cases should include a lateral film of the neck of the femur as well as the customary stereoscopic anteroposterior views.

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E. W. Cleary, M. D. (490 Post Street, San Francisco). Doctor Mensor has done a thing both courageous and worth while. He has constrained us to face stark reality, helped us to stop "kidding ourselves along," if a slang expression may be permitted.

When facts are thus honestly faced and the futility of miscalled conservative measures revealed, the way is paved for a more adequate therapy.

Fracture of the neck of the femur is a desperate emergency. Mere humans endowed with no supernatural powers may not hope to cope with it in degree of suffering and mortality inherent in a lesion which most frequently appears as part of the terminal experience of an organism near death from senility. Nevertheless, methods have been devised and adequate means found to reduce and internally fix the head fragment to the shaft. Already sufficient experience has been had with these relatively exact and positive measures to demonstrate that they are actually conservative, and that their use reduces suffering and complications, and gives the patient the best possible chance to recover.

Such papers as Doctor Mensor has presented help to lay a foundation of fact upon which we may eventually promote an adequate therapy for this lesion without the consequence that our therapy, because of its positive nature, will bring upon us undeserved blame for the considerable percentage of nonunions, complications and deaths, which are the unavoidable results of the severity of the lesion and the physical debility of the average patient.

❦

Doctors Mensor and Dewey (Closing).—The authors wish to thank Doctors McMasters, Haldeman, and Cleary for their discussions of the subject presented.

There are some points in discussion which we believe need elucidating. Doctor Haldeman has stated that these cases do not represent a true cross-section of end-results obtained in the San Francisco Hospital, because all united fractures were discharged and only those in which union was delayed or absent were sent to Laguna Honda Home. We believe this statement is somewhat in error, as the statistics show that the average period of hospitalization in the San Francisco Hospital, before discharge to the Laguna Honda Home, was seventy-four days, and that the minimum time hospitalized at the San Francisco Hospital was nine days. It is obvious that in an average of seventy-four days, in fractures of this nature it is impossible to determine whether bony union will ensue as a result of the therapy. We do, however, admit that the data is not entirely complete, and it is our intention within the next few months to analyze a similar number of consecutive cases over the same period at the San Francisco Hospital, thus securing definite figures as to the percentage of union obtained in those cases that were discharged directly from the San Francisco Hospital and not seen at the Laguna Honda Home. We also fear that Doctor Haldeman is somewhat too optimistic in his belief that two-thirds of these cases will result in bony union by use of the manipulative reduction and the Whitman type of plaster spica cast.

We heartily agree with Doctor Cleary that the most hopeful means of treatment of this fracture lies in some form of internal splintage which will absolutely fix the fragments. At present we are not completely convinced that the Smith-Peterson nail is the ideal method of treatment, but feel that the use of an autogenous bone peg in fresh cases accomplishes the necessary fixation, at the same time acting as a direct stimulation for osteogenesis.

Doctor McMasters has very rightly called attention to the importance of lateral x-rays in this fracture, and it is our belief, now that this technique is more or less a common practice, that many of the fractures in this series that were reduced by the operator, with apparent passible reduction, would have been given further treatment if a lateral roentgenogram had been made.

CATARACTS FOLLOWING THE USE OF DINITROPHENOL: A SUMMARY OF THIRTY-TWO CASES*

By Frank H. Rodin, M.D.
San Francisco

Discussion *by Warren D. Horner, M. D., San Francisco; Hans Barkan, M. D., San Francisco; Harold F. Whalman, M. D., Los Angeles.*

CATARACTS following the use of dinitrophenol have been reported by Boardman,[1] Horner, Jones and Boardman,[2] Shutes,[3] Cogan and Cogan,[4] Lazar,[5] Kniskern,[6] and Allen and Benson.[7]

In this report I shall summarize thirty-two cases of cataracts, following the use of dinitrophenol, which have been observed in the San Francisco Bay region—San Francisco, Oakland and the surrounding towns. The population of this region is about one and one-quarter million.

The information was obtained by communicating with the various ophthalmologists in the San Francisco Bay region, who supplied the necessary data.

No attempt will be made to describe the appearance of the cataracts seen in these patients, as this has been well done in the reported cases.

SUMMARY OF THE DATA OBTAINED

Table 1 summarizes the information obtained. There were thirty-two cases. Only such cases were included in which there were definite clinical data that the cataracts have followed the use of dinitrophenol. All the patients were females. Cogan and Cogan's [4] first case was the only male patient so far reported.

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